

Preparation of Herbal Syrup Using Logs of *Tinospora Cordifolia*

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Abstract: *Tinospora cordifolia* is a well-known medicinal herb widely used in Ayurvedic medicine due to its numerous health benefits. It is a climbing shrub that belongs to the family Menispermaceae and is primarily native to India, with its presence also reported in parts of China, Australia, and Africa. Commonly referred to as Guduchi, Amrita, or Giloy, this plant is valued for its therapeutic potential, with every part of the plant exhibiting medicinal properties. *Tinospora cordifolia* contains a rich variety of bioactive compounds, including terpenoids, alkaloids, steroids, lignans, flavonoids, and glycosides. These constituents contribute to its wide range of pharmacological activities such as immunomodulatory, anti-diabetic, antifungal, hepatoprotective, anti-cancer, anti-Human Immunodeficiency Virus (HIV), antitoxic, and neuroprotective effects, including potential benefits in managing Parkinson's disease. This review aims to explore and highlight the diverse therapeutic properties and pharmacological applications of *Tinospora cordifolia* for human health.

Keywords: *Tinospora cordifolia*; pharmacological activity; Giloy; immunity; Amrita; anti-diabetic

I. INTRODUCTION

In the modern era of globalization and technological advancement, there has been a noticeable rise in both infectious and non-infectious diseases. This increase is largely attributed to changes in lifestyle, such as elevated stress levels, work-related pressure, shifts in climate, and unhealthy dietary habits. Additionally, the prevalence of conditions such as heart disease, high cholesterol, stress-related disorders, diabetes, rheumatoid arthritis, and hypertension has also grown significantly.

As a result, many people are turning away from conventional allopathic medicine and seeking natural or Ayurvedic alternatives. This shift is due to several factors, including the growing problem of antimicrobial resistance caused by overuse of antibiotics, the adverse side effects of synthetic drugs, their high cost, and a decline in their overall effectiveness. In response to these challenges, ongoing research is focusing on the development of alternative remedies that can enhance the health of both humans and animals.

Herbal formulations, which are made using one or more medicinal plants in specific proportions, are designed to offer therapeutic, diagnostic, and health-promoting benefits. This form of treatment is also known as botanical medicine or phytomedicine.

1.1 *Tinospora Cordifolia*



Tinospora cordifolia

Botanical Name: *Tinospora cordifolia*

Family: Menispermaceae

Synonyms: Amruth, Giloya, Guduchi

Tinospora cordifolia is a climbing shrub that belongs to the Menispermaceae family. It is commonly found in India, China, and some parts of Australia. This plant is recognized by different local names depending on the language and region.

Some of its regional names include: *Tinospora* in English,

Gilo in Punjabi, Guluchi in Oriya (Odia), Gulvel in Marathi, Chittamrutu in Malayalam, Amrita and Gilo in Kashmiri, Giloy in Haryanvi, Gulancha in Bengali, Chakralakshanika in Sanskrit, Gurcha in Hindi, Garo and Galac in Gujarati.

MORPHOLOGY:-

Tinospora cordifolia is a large, irregularly growing, extensively spreading climbing shrub with numerous twisted branches exhibiting various forms. Its stem is slender, elongated, and climbing in nature. The bark of the stem ranges in color from white to grey. When ground into powder, the stem appears creamish brown or light brown, emits a distinct aroma, and has a bitter taste. The plant is used to address multiple health conditions. The processed extract from the stem, known as Guduchi-satva, is particularly used for starch extraction. It serves as a nourishing food that is easy to digest.

The plant has simple, long-petioled leaves measuring approximately 15 centimeters. The leaves are circular at the base, pulvinate, and heart-shaped with an outward curve. The leaf blade is oval, ranging from 10 to 20 centimeters in length, has seven prominent veins, and is extremely thin and membranous. The flowers of the plant are unisexual, axillary in position, and greenishyellow in color. They grow on floral branches that are between 2 to 9 centimeters long. Male flowers tend to grow in clusters, whereas female flowers are typically solitary. The plant bears single-seeded fruits that ripen during the winter season and bloom during the summer. Its aerial roots exhibit a tetra- to penta-vascular arrangement, appear thread-like, elevated

Significance in Ayurveda

Tinospora cordifolia holds a prominent place in Ayurvedic medicine due to its wide range of therapeutic benefits, with every part of the plant contributing to human health. Traditionally, it has been consumed for its healing properties and is a key component in many folk and Ayurvedic remedies. It is commonly processed into juices, decoctions, pastes, powders, and tablets for medicinal use. These forms are used in the treatment of various health conditions such as general weakness, fever, skin ailments, chronic diarrhea, jaundice, asthma, and even bone fractures, as described in ancient Ayurvedic texts like Rasayana, Sangrahi, Balya, Agnideepana, Tridoshshamaka, Dahnashaka, Mehnashaka, Kasa- swasahara, Pandunashaka, Kamla-Kushta-Vataraktanashaka, Jwarhara, Krimihara, Prameha, Arshnashaka, and Kricch-Hridroganashak.

Commonly referred to as Amrita, meaning “divine nectar,” this plant is especially valued for its blood-cleansing properties, particularly its role in eliminating damaged or faulty red blood cells from the bloodstream. Due to its high alkaloid content, the Ayurvedic Pharmacopoeia of India officially recognizes the stem of *Tinospora cordifolia* as a legitimate medicinal resource.

Leaves: The powdered leaves and their decoction, especially when taken with cow’s milk, have traditionally been used to treat ailments like gout, ulcers, jaundice, fever, and wounds, and are also known to aid in blood sugar regulation.

Bark: In northern Gujarat, the bark, along with the root and stem, is customarily used in local medicine to manage a range of health conditions.





Tinospora cordifolia bark:

Stem: The extract of the stem is used as a traditional remedy for conditions such as jaundice, fever, and skin disorders, and is often regarded as a mystical or powerful herbal medicine. The starch extracted from the stem (known as satva) is widely used as a tonic to promote general health and strength. Additionally, a combination of the root and stem is recommended as a remedy for insect bites and scorpion stings.

Chemical Constituents: *Tinospora cordifolia* contains a wide range of bioactive compounds, including diterpenoid lactones, alkaloids, steroids, glycosides, polysaccharides, aliphatic compounds, phenols, and sesquiterpenoids. These chemical constituents are responsible for the plant's diverse medicinal properties.

AIM AND OBJECTIVE:

AIM: Preparation of Herbal Syrup using logs of *Tinospora cordifolia*

OBJECTIVE:

To extract and utilize the active phytochemical constituents from the logs of *Tinospora cordifolia* for medicinal purposes.

To formulate a stable and palatable herbal syrup using natural ingredients for easy oral administration.

To evaluate the therapeutic properties of the herbal syrup, such as its immunomodulatory, antipyretic, and anti-inflammatory effects.

To standardize the preparation process to ensure consistent quality, safety, and efficacy of the herbal syrup.

To promote the use of traditional medicinal plants in modern herbal formulations for the treatment and prevention of common health disorders.

LITERATURE REVIEW

1. Singh et al. (2003)

Singh et al. reported that *Tinospora cordifolia* possesses a wide range of pharmacological properties including immunomodulatory, antidiabetic, and hepatoprotective effects. The stem of the plant is particularly rich in alkaloids, glycosides, and diterpenoid lactones, making it highly suitable for use in herbal syrup formulations for enhancing immunity and metabolic health.

Reference: Singh S.S. et al., Indian Journal of Pharmacology, 2003.

2. Sahu et al. (2010)

Sahu et al. formulated and evaluated a polyherbal antidiabetic syrup containing *Tinospora cordifolia* stem extract. Their results demonstrated significant hypoglycemic activity in animal models, supporting the use of stem-based syrup in the management of diabetes. Reference: Sahu R.K. et al., Journal of Pharmacy Research, 2010.



3. Patel et al. (2013)

Patel et al. developed a herbal syrup from *Tinospora cordifolia* and assessed its hepatoprotective effects. The syrup was found to be effective in reducing chemically induced liver damage in rats, further validating the medicinal use of stem-based preparations.

Reference: Patel M.B. et al., International Journal of Pharmaceutical Sciences and Research, 2013.

4. Thatte et al. (1989)

Thatte et al. demonstrated that *Tinospora cordifolia* stem extract enhances the immune response and can modulate infections such as *Escherichia coli*-induced peritonitis, further supporting its use in immunity-boosting syrups.

Reference: Thatte U.M. et al., Indian Journal of Gastroenterology, 1989.

5. Kulkarni et al. (2017)

Kulkarni et al. conducted a phytochemical analysis and stability study on a herbal syrup prepared from the stem logs of *Tinospora cordifolia*. The study confirmed the presence of bioactive compounds and demonstrated that the syrup formulation retained its potency over time when properly preserved.

Reference: Kulkarni R.A. et al., Asian Journal of Pharmaceutical and Clinical Research, 2017.

6. Prince et al. (2004)

Prince et al. investigated the antioxidant properties of *Tinospora cordifolia* stem extracts and found them to be effective in reducing oxidative stress, a benefit that enhances the therapeutic value of stem-based syrup formulations.

Reference: Prince M.P. et al., Journal of Ethnopharmacology, 2004.

7. Jain et al. (1994)

Jain et al. studied the anti-inflammatory activity of *Tinospora cordifolia* and concluded that stem extracts significantly reduced inflammation in laboratory models. This supports the incorporation of the stem extract into herbal syrups aimed at fever and inflammation.

Reference: Jain A. et al., Indian Drugs, 1994.



Terpenoides	Tinosporide, Furanolactone diterpene, Furanolactone clerodane diterpene, furanoid diterpene, Tinosporaside, ecdysterone makisterone and several glucosides isolated as poly acetate, phenylpropene disaccharides cordifolioside A, B and C, cordifolioside D and E, Tinocordioside, cordioside, palmatosides C and F, Sesquiterpene glucoside tinocordifolioside, Sesquiterpene tinocordifolin	[21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31]
Alkaloid	Tinosporine, (S), Magnoflorine, (S), Berberine, (S), Choline, (S), Jatrorrhizine, (S), 1,2-Substituted pyrrolidine(S), Alkaloids, viz. jatrorrhizine, palmatine, beberine, tembeterine, choline.	[32, 33, 34, 35, 36]
Diterpenoid lactones	Diterpenoid (S), tinosporoncolumbin (S), clerodane derivatives (W), tinosporon (W), tinosporisides (W), jateorine (W), columbin (W), tinosporal, tinosporide.	
Glycoside	18 Norderodane glycoside (S), furanoid diterpene glycoside (S), tinocordioside (S), tinocordifolioside (S), cordioside (S), cordifolioside A, B, C, D (S), syringin (S), syringinapiosylglycoside (S), palmatosides	

Procedure:

Materials Required:

Logs or stems of *Tinospora cordifolia* (also known as Giloy) Clean water
Jaggery or sugar (as a sweetening agent)
Lemon juice or citric acid (as a preservative) Sterilized containers or bottles
Muslin cloth or fine strainer Measuring equipment
Heating vessel



Step-by-Step Procedure:

1. Collection and Cleaning of Raw Material:

Begin by collecting fresh or dried stems (logs) of *Tinospora cordifolia*. Rinse them thoroughly under running water to eliminate any dirt, dust, or external impurities.

2. Chopping and Crushing:

Cut the cleaned logs into small pieces. Then crush them using a mortar and pestle or a grinder to increase the surface area for better extraction of active compounds.

3. Decoction Preparation (Extraction):

Take approximately 100 grams of the crushed *Tinospora cordifolia* pieces. Add 1 liter of clean water to them. Boil the mixture slowly over a low flame until the volume reduces to about 250 to 300 milliliters. This concentrated liquid is referred to as the decoction and is used for medicinal purposes.

4. Filtration:

While the decoction is still hot, filter it using a muslin cloth or a fine strainer to remove all solid residues. Collect the clear liquid extract in a clean vessel for the next step.

5. Addition of Sweetener:

To the filtered decoction, add approximately 500 grams of jaggery or sugar. Gently heat the mixture while stirring continuously until the sweetener is fully dissolved. Continue boiling the mixture for a few more minutes until it reaches a syrupy consistency.

6. Addition of Preservatives and Flavoring Agents (Optional):

To enhance shelf life, add 1 to 2 teaspoons of lemon juice or a small amount of citric acid as a natural preservative. Optionally, for improved flavor and additional medicinal value, you may add ginger juice or cardamom powder.

7. Cooling and Bottling:

Let the prepared syrup cool down to room temperature.

Use a funnel to pour the syrup into sterilized glass or plastic bottles.

Seal the bottles tightly and label them with the preparation date and expiry date.

Storage:

Keep the syrup in a cool, dry place, away from direct sunlight. For longer shelf life, refrigeration is recommended.



Chopping and Crushing:





Decoction Preparation (Extraction):



Sweetene sugar powderr





Citric acid Lemon



ginger juice flavouring agent

TINOSPORACORDIFOLIA EFFECT:

Protective Effect on the Cardiovascular System (CVS):

Tinospora cordifolia, also known as Amrita, exhibits significant protective effects on the cardiovascular system, primarily due to the presence of the alkaloid berberine. Berberine is known to support vascular health by reducing endothelial inflammation. Additionally, the plant helps regulate lipid metabolism, particularly by inhibiting the absorption of cholesterol and glucuronides, which is beneficial in cases where lipid metabolism is disrupted due to alcohol consumption.

The plant also offers cardioprotective effects against cadmium-induced toxicity by modulating the activity of various antioxidant enzymes, including superoxide dismutase, catalase, reduced glutathione, glutathione peroxidase, and glutathione transferase. It further influences levels of glycoproteins, kinase enzymes, and lactate dehydrogenase, as well as sugar components like hexose, hexosamine, fucose, and sialic acid.



Amrita has also shown the potential to stabilize atrial and ventricular fibrillation caused by calcium chloride, and its antioxidant properties help protect the heart from ischemia-reperfusion injury, a condition commonly linked to oxidative stress and leading to myocardial infarction (heart attack).

Antistress Effect:

Studies conducted by Sharma et al. revealed that an ethanol extract of *Tinospora cordifolia*, administered at a dose of 100 milligrams per kilogram, demonstrated a significant antistress effect when compared to the standard medication diazepam, which was given at a dose of 2.5 milligrams per kilogram. The extract caused only a mild degree of behavioral and cognitive disturbances, indicating its relative safety.

Antidiabetic Effect of *Tinospora cordifolia* (Amrita/Giloy):

Tinospora cordifolia exhibits strong antidiabetic properties due to its rich content of alkaloids (e.g., magnoflorine, palmatine), cardiac glycosides, tannins, saponins, flavonoids, and steroids. These compounds help regulate blood sugar levels and mimic insulin-like activity, enhancing glucose uptake and metabolic function.

Studies have shown that extracts of the stem inhibit the alpha-glucosidase enzyme, which aids in controlling post-meal blood glucose spikes. In gestational diabetes models, Giloy reduced oxidative stress, offering protective effects for both mother and fetus.

Root extracts of the plant also lowered blood and urine glucose levels in alloxan-induced diabetic animals. Furthermore, herbal formulations containing Giloy—such as Ilogen-Excel, Hyponidd, and Dihar—have proven effective in diabetic rat models, improving insulin levels and glucose metabolism.

Anti-Ulcer, Anti-Diarrheal, and Other Health Benefits of *Tinospora cordifolia*

Tinospora cordifolia (Amrita or Guduchi) demonstrates anti-ulcer and anti-diarrheal properties in rodent studies. It significantly reduces diarrhea, ulcer index, and gastric volume, while increasing gastric pH. The compound epoxy-clerodane-diterpene, derived from the plant, boosts levels of prostaglandin E2 (PGE2), anti-inflammatory cytokines (IL-4, IL-10), and pro-angiogenic factors (VEGF, EGF). It also offers protection against stress-induced ulcers, showing effectiveness comparable to diazepam.

Evolution test and result :

This test involves sensory inspection to assess appearance and Acceptability.

Color: Greenish brown to dark brown Odor: Characteristic herbal aroma

Taste: Bitter-sweet

Consistency: Viscous, free-flowing liquid

PH Determination: Measured using a Brookfield viscometer. Ensures proper syrup consistency for palatability and dosing.

Normal range: 100–300 centipoise we got in range between 150-250
(depending on sugar content)

3. Specific Gravity

Determined using a specific gravity bottle or pycnometer. Expected range: 1.20 – 1.35

Indicates the density and concentration of the syrup.

4. Viscosity Test

Measured using a Brookfield viscometer.

Ensures proper syrup consistency for palatability and dosing.

Normal range: 100–300 centipoise we got in range between 150-250 (depending on sugar content)



5. Total Solid Content

The syrup is evaporated and the remaining solid residue is weighed. Acceptable limit: Not less than 60% w/v to ensure preservation and concentration of actives.

6. Microbial Load Test

Includes total viable bacterial count, yeast and mold count.

Acceptable limits:

Bacterial count: Less than 10^4 CFU/mL Fungal count: Less than 10^2 CFU/mL

Should be free from pathogens like *Escherichia coli*, *Salmonella*, *Pseudo-monas aeruginosa*, and *Staphylococcus aureus*

7. Phytochemical Screening

Qualitative tests to detect the presence of active plant constituents:

Alkaloids (e.g., by Mayer's or Wagner's test) Glycosides

Saponins

Flavonoids Terpenoids

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8. Stability Test (Accelerated and Real-time):

The syrup is stored at different temperatures (for example, 25°C, 40°C, and 60°C) and tested over time (1, 3, and 6 months). Parameters like color, pH, taste, and microbial growth are checked to confirm shelf life and physical stability.

9. Assay of Marker Compounds (Optional/Advanced):

High-Performance Thin Layer Chromatography (HPTLC) or High- Performance Liquid Chromatography (HPLC) can be used to quantify bioactive compounds in *Tinospora cordifolia*. Marker-based standardization is required.

II. CONCLUSION

The plant *Amrita* (*Tinospora cordifolia*) is widely recognized in traditional medicinal systems and is considered one of the most commercially valuable medicinal plants. It offers a vast range of therapeutic benefits, including antioxidant, hepatoprotective, hypoglycemic, immunomodulatory, anti-inflammatory, bone- strengthening, cholesterol-regulating, fever-reducing, cardioprotective, nephroprotective, neuroprotective, and anti-anxiety properties.

Due to its natural abundance, sustainability, and cost-effectiveness, *Tinospora cordifolia* is cultivated in tropical and subtropical regions of Asia. It is a well-researched plant. Biological studies and clinical research support its safety profile and minimal side effects. *Guduchi* stands out as a strong potential candidate as conventional drug replacement and also as a dietary supplement due to its exceptional medicinal value. It holds strong promise in areas where conventional treatments offer limited benefits.

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